

Remarks/Arguments:

Claims 1-9 are presently pending. Claim 1 has been amended. Reconsideration is respectfully requested in view of the above amendments and the following remarks.

Applicant thanks the Examiner for the courtesy of the telephone interview conducted on April 20, 2010. During the interview, the Examiner's interpretation of Khoo et al. (US Pat. 5,842,420) was discussed. Applicant's representatives proposed claim amendments for overcoming the rejection based on Khoo. No agreement was reached on the allowability of the claims.

Claim Rejections Under 35 U.S.C. § 103

Claims 1-9 stand rejected under 35 U.S.C. 103(a) as unpatentable over Nobuo et al. (JP S62-44108) in view of Goodnight (US Pat. 6457561B1) further in view of Choi (US Pat. 5971724) and Khoo et al. (US Pat. 5,842,420).” However, Applicant respectfully submits that these claims are patentable over the cited art for the reasons set forth below.

Applicant's invention, as recited by claim 1, includes features which are neither disclosed nor suggested by the cited art, namely:

...an annular lubricant groove having an inner rim and an outer rim...

...a forward leading groove...having...a second end opening to the inner rim of the annular lubricant groove...

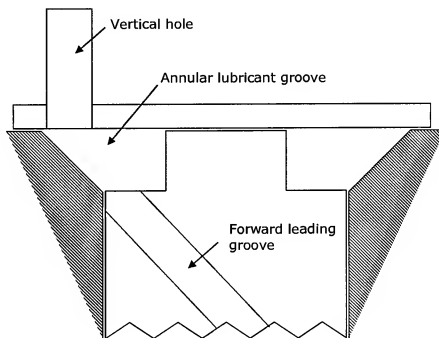
...a vertical hole...having a first end communicating with the outer rim of the annular lubricant groove...

...wherein the forward leading groove, the annular lubricant groove, and the vertical hole define a lubricant pathway such that (1) the lubricant passes from the forward leading groove to the annular lubricant groove, and (2) the lubricant passes from the annular lubricant groove to the vertical hole without re-entering the forward leading groove.

The forward leading groove opens to the inner rim of the annular lubricant groove. The vertical hole opens to the outer rim of the annular lubricant groove. Together, they form a lubricant pathway such that (1) the lubricant passes from the forward leading groove to the annular lubricant groove, and (2) the lubricant passes from the annular lubricant groove to the

vertical hole without re-entering the forward leading groove. This feature is described in the application, for example, at page 4, line 16 to page 6, line 2; and FIGS. 1-3. No new matter is added.

The above features of claim 1 are shown in the exemplary figure below for the purposes of illustration.



As shown in the above figure, the forward leading groove opens to the inner rim of the annular lubricant groove. The vertical hole opens to the outer rim of the annular lubricant groove. Lubricant passes up the forward leading groove and into the annular lubricant groove. Lubricant in the annular lubricant groove passes outward (due to centrifugal force) and up into the vertical hole without re-entering the forward leading groove. Applicant respectfully submits that the cited art fails to disclose, teach, or suggest at least the above features of claim 1.

The Office Action acknowledges that Nobuo in view of Goodnight and Choi fail to disclose the above features of claim 1. Applicant respectfully submits that the addition of Khoo fails to

make up for the deficiencies of Nobuo, Goodnight, and Choi with respect to at least these features.

Khoo is directed to a crankshaft lubrication system. As illustrated in FIGS. 4 and 5, Khoo discloses a crankshaft 30. A bearing groove 68 is formed in the shaft 30 to provide a lubrication channel. The bearing groove terminates at a port 70. Port 70 opens to an eccentric lubrication duct 72. See Khoo at column 3, lines 28-65, and FIGS. 4-5.

As discussed during the interview, Khoo illustrates a notch formed in shaft 30 above port 70. The Examiner indicates that this notch corresponds to the annular lubricant groove of claim 1. Applicant respectfully disagrees.

Khoo fails to disclose, teach, or suggest that lubricant flows to the notch formed above port 70. Regarding the flow of lubricant, Khoo discloses:

[T]he oil is drawn upwards through the slanted lubrication duct 64 and exits port 66. The oil then moves further upwards through the annulus formed by the bearing groove 68 and the interior wall of the bearing housing 18 as shown in FIG. 1. The oil then enters the eccentric lubrication duct 72 through the port 70.

See Khoo at column 3, lines 58-63. While Khoo discloses that lubricant travels in the annulus formed between groove 68 and the bearing, Khoo fails to disclose, teach, or suggest that lubricant goes outside of the area created by the bearing groove 68. Further, Khoo fails to disclose, teach, or suggest that lubricant passes above port 70. The Examiner's assertion to the contrary is entirely unsupported by Khoo.

Further, even if Khoo taught that lubricant passed outside of bearing groove 68 and above port 70, which it does not, Applicant submits that Khoo is still silent on lubricant passing from the notch formed above port 70 downward and into port 70. This is different from the claimed invention, which requires that the lubricant pass from the annular lubricant groove to the vertical hole.

Still further, for lubricant to pass from the notch formed above port 70 into port 70, the lubricant would have to pass downward and at least briefly re-enter groove 68. This is also different from the claimed invention, which requires that the lubricant passes from the annular lubricant groove to the vertical hole without re-entering the forward leading groove.

Accordingly, for the above reasons, Applicant respectfully submits that the cited art fails to disclose, teach, or suggest "the forward leading groove, the annular lubricant groove, and the vertical hole define a lubricant pathway such that (1) the lubricant passes from the forward leading groove to the annular lubricant groove, and (2) the lubricant passes from the annular lubricant groove to the vertical hole without re-entering the forward leading groove," as recited in claim 1.

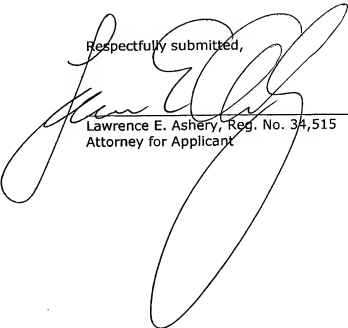
It is because Applicant's claimed invention includes the above features that the following advantages are achieved. "[F]orward leading groove 137 opens into inner rim of annular lubricant groove 141, and the lubricant is pushed to the outer rim of annular lubricant groove 141 by the centrifugal force [generated by the rotation of main shaft 123], so that little amount of the lubricant flows [backward] into forward leading groove 137." See the application at page 7, lines 11-14.

Accordingly, for the reasons set forth above, claim 1 is allowable over the cited art. Withdrawal of the rejection and allowance of claim 1 is respectfully requested.

Claims 2-9 include all of the features of claim 1, from which they depend. Thus, claims 2-9 are also allowable over the cited art for at least the reasons set forth above with respect to claim 1. Withdrawal of the rejection and allowance of claims 2-8 is respectfully requested.

Applicant respectfully asserts that the above-identified application is in condition for allowance, which action is respectfully requested.

Respectfully submitted,



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